

REMARKS

The above-identified patent application has been amended and Applicants respectfully request the Examiner to reconsider and again examine the claims as amended.

Claims 1-38 are pending in the application. Claims 1-16 and 18-38 are rejected. Claim 17 contains allowable subject matter. Claim 34 is amended herein

The Rejections Under 35 U.S.C. §103(a)

Ryu et al. in View of Dwyer et al.

The Examiner rejects Claims 1-8, 13-16, and 18-28 under 35 U.S.C. §103(a) as being unpatentable over Ryu et al. (U.S. Patent number 6,078,895) in view of Dwyer et al. (U.S. Patent number 6,140,941). The Examiner asserts that Ryu et al. discloses a method of determining a vehicle trip on a roadway comprising: providing a plurality of vehicle detections from a plurality of gateways, determining a maximum travel time between corresponding pairs of the plurality of gateways, correlating corresponding pairs of the plurality of vehicle detections by determining that a travel time between each of the gateways of each of the corresponding pairs of detectors is less than a corresponding maximum travel time, and determining the boundaries of the trip. The Examiner recognizes that Ryu et al. does not teach determining a plurality of chainable detections. The Examiner relies upon Dwyer et al. as teaching the plurality of chainable detections. The Examiner concludes that "...it would have been obvious to one of ordinary skill in the art...to incorporate the teaching of Ryu in Dwyer."

Contrary to the Examiner's assertion, Applicants submit that Claim 1 is patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "...determining a plurality of chainable detections..." as set forth in Claim 1.

With this particular arrangement, "[t]rips are formed from chained detections on a single vehicle." (page 10, line 15) The specification further states, in regard to FIG. 2, at page 8, lines 12-14 that, "...enforcement gateways 17 and TPRs 16 and other sensors are used as detection devices in addition to the TGs 18. The gateways 46a-46g are interconnected by a plurality of roadway segments 48a-48m." Therefore, it will be appreciated that the claimed "plurality of chainable detections" are provided by gateways, each of which is associated with a roadway segment, and each of which can detect a particular vehicle in an open ticket toll collection system. As described in the specification, for example at page 1, lines 24-26, "[i]n an open ticket toll collection system (also referred to as an open-road, no lane barrier system), toll gateways are placed along the mainline roadways as opposed to a closed ticket system which includes toll gateways at the roadway entry and exit points."

The Examiner recognizes that Ryu et al. does not describe or suggest the claimed chainable detections. Applicants submit that Dwyer et al. fails to overcome the above deficiencies in Ryu et al. The Examiner relies upon Dwyer et al. in Fig. 2a and at column 1, lines 46-67 to teach the plurality of chainable detections, which, in describing the roadside toll collector 11 (Fig. 2a), states:

"A plurality of transponder locator antennas 27 is also disposed on the second gantry 21 that are used to locate transponders 18 in the vehicles 17. Each of the vehicle detector and classification systems 26 include a laser-based sensor that generates a dual fan-beam scanning laser beam that is used to determine the speed, height, length and profile of vehicles 17 as they pass a toll collection zone."

Applicants submit that the plurality of transponder locator antennas 27 of Dwyer et al., located together on a common gantry 21 (Fig. 2a), together merely provide a detection of a vehicle as it enters or exits a roadway in a closed ticket toll collection system. Applicants further submit that the vehicle detector and classification systems 26 together also merely provide a detection of a vehicle as it enters or exits a roadway. As described, for example at column 4, lines 13-16, "[t]he vehicles are detected when they enter and exit the toll road 19 which provides data indicative of the locations and times of entry into and exit from the toll road 19." Dwyer et al. merely places no-barrier toll gantries in a closed ticket toll collection system, at the entrances

and exits to the roadway. Dwyer et al. does not describe or suggest the claimed plurality of chainable detections.

Applicants submit that Claim 1 is further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "... determining that a travel time between each of the gateways of each of the corresponding pairs of detections is less than a corresponding maximum travel time," as set forth in Claim 1.

To teach the above determining step, the Examiner relies upon Ryu et al., at column 4, lines 10-33, which states:

"In this embodiment, the basic data is collected at predetermined time intervals, for instance, 15 minutes. In step S100, a determination is made as to whether or not the current time is the data collection time. If so, step S110 proceeds to collect various kinds of data for vehicles passing through the toll gate by lanes, workers, and kind of vehicles, for 15 minutes, the unit time. Then, in step S120, the data collected in step S110 is classified into entrance toll gates, and in step S150, the average running time of vehicles leaving the toll gates and the number of passing vehicles is calculated by the kinds of vehicles. The calculation result is stored in step S170.

However, while a vehicle passes through a tollway, it possibly stays for a long time at a rest stop. If the average running time is calculated including this vehicle, there is a difference between the obtained average running time and the overall running time. [Emphasis added] In consideration of it, in step S130 the average distribution in accordance with running time is calculated, and in step S140 data on a vehicle having a value deviating from a predetermined value in the average distribution is excluded. In step S150 only data on vehicles falling within the predetermined value in the average distribution is preferably used to obtain the average running time by the entrance toll gates. Besides, a long time may be taken during the issuance of a pass or the payment of a toll at the entrance/exit toll gate."

Applicants submit that the "overall running time" of Ryu et al. is the actual measured running time of a vehicle, which is compared against an "average running time." Applicants submit that Ryu et al. and Dwyer et al. neither describe nor suggest determining that a travel time

between each of the gateways of each of the corresponding pairs of detections is less than a corresponding maximum travel time as claimed.

In view of the above, Applicants submit that Claim 1 is patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al.

Claims 2-8, 13-16, an 18-28 depend from and thus include the limitations of Claim 1. Thus, Applicants submit that Claims 2-8, 13-16, an 18-28 are patentably distinct over the cited references generally for the reasons discussed above in conjunction with Claim 1.

Applicants submit that Claims 4-7 are further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "...filtering a plurality of vehicle transactions for providing the plurality of vehicle detections," as set forth in Claim 4 and as required by Claims 5-7.

With this particular arrangement, as described, for example, at page 5, lines 15-18, "[a] transaction is a record of a vehicle crossing a toll gateway or other roadside device on the roadway where a record of the vehicle crossing the point can be recorded. A detection is provided by a trip processor processing a transaction or group of transactions to filter out duplicate transactions and certain ambiguous transactions." Therefore, duplicate and ambiguous transactions can be identified and filtered out.

The Examiner relies upon Dwyer et al., at column 8, lines 47-59 to teach the filtering, which states:

"Dual toll transaction processors 12 use computer and image processing technology to match the toll road 19 exit and entry transactions. This is done with transponder data or by identifying license plate numbers derived from the video images, to match entry and exit images for each vehicle 17 not having a transponder 18. The toll transactions and required video images are transmitted to the central revenue management system 14 for processing. The revenue management system 14 receives tolling transactions (paired entries and exits and exceptions) from the toll transaction processors 12 and computes the appropriate

tolls depending on distance traveled, time of day, account type, vehicle classification and other pertinent variables."

Dwyer et al. describes a matching of toll road exit and entry transactions. Applicants cannot find the claimed filtering in Dwyer et al. and respectfully request clarification.

Applicants submit that Claim 19 is further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "... forming the trip by chaining the plurality of chainable detections," as set forth in Claim 19.

Applicants submit that Claim 20 is further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "... waiting for the plurality of chainable detections," as set forth in Claim 20.

Applicants submit that Claim 21 is further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "... determining a first time wherein each of the plurality of chainable detections has a first extrapolation region terminating earlier than the first time," as set forth in Claim 21.

Applicants submit that Claim 22 is further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "...determining a second time wherein each of the plurality of chainable detections occurring later than the first time has a second extrapolation region terminating earlier than the second time, is evaluated for verifying," as set forth in Claim 22.

In view of the above, Applicants submit that the rejection of Claims 1-8, 13-16, and 18-28 under 35 U.S.C. §103(a) should be removed.

Ryu et al. in View of Dwyer et al. and Ohba et al.

The Examiner rejects Claims 9-11 under 35 U.S.C. §103(a) as being unpatentable over Ryu et al. in view of Dwyer et al. and further in view of Ohba et al. (U.S. Patent number 6,449,555).

Regarding Claims 9, 10, and 11, the Examiner asserts that Ryu et al. and Dwyer et al. disclose all the limitations of Claim 1. Regarding Claim 9, the Examiner recognizes that Ryu et al. and Dwyer et al. fail to explicitly disclose the travel time between each of the detections is greater than the minimum travel time. The Examiner relies upon Ohba et al. to teach the travel time between each of the detections is greater than a minimum travel time.

Regarding Claim 10, the Examiner recognizes that Ryu et al. and Dwyer et al. fail to explicitly disclose the maximum travel time comprises an incident free maximum travel time. The Examiner relies upon Ohba et al. to teach that the maximum travel time comprises an incident free maximum travel time.

Regarding Claim 11, the Examiner recognizes that Ryu et al. and Dwyer et al. fail to explicitly disclose an expected travel time and the maximum travel time is the longer of the expected travel time and the incident free maximum travel time. The Examiner relies upon Ohba et al. to teach the expected travel time and the maximum travel time is the longer of the expected travel time and the incident free maximum travel time. The Examiner concludes that it would have been "...obvious to one of ordinary skill in the art...to incorporate the teaching of Ohba in Ryu and Dwyer."

Applicants submit that Claims 9-11 are patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al. and Ohba et al., since the cited references neither describe nor suggest "... determining a plurality of chainable detections..." as set forth in Claim 1 and as required by Claims 9-11.

Ryu et al. and Dwyer are discussed above. Applicants submit that Ohba et al. also fails to overcome the above deficiencies in Ryu et al. and Dwyer et al. Ohba et al. merely provides in FIG. 1 tollgates, each having an entry and an exit. According to Ohba at column 5, lines 4-10 states:

"More specifically, a tollroad 11 has a plurality of tollgates 12 (12A to 12D). Each tollgate has an electronic apparatus (not shown) including a computer and the like and having a function of issuing a pass that records data representing the entry point, entry time, exit point, and exit time of a vehicle 13, kind of vehicle, and date, and reading the data recorded on the pass."

Therefore, Applicants submit that Ohba et al. merely provides the tollgates, which record entries and exits of a vehicle from a roadway. Ohba et al. does not describe or suggest the determining a plurality of chainable detections as claimed.

Applicants further submit that Claims 9-11 are patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al. and Ohba et al., since the cited references neither describe nor suggest "... determining that a travel time between each of the gateways of each of the corresponding pairs of detections is less than a corresponding maximum travel time," as set forth in Claim 1 and as required by Claims 9-11.

Ryu et al. and Dwyer are discussed above. At column 6, lines 7-23, Ohba et al. states:

"(1) For the travel time, data with the longest travel time is regarded as unusual data and removed. [Emphasis Added] After this removal, the standard deviation is calculated, and it is checked whether the condition is satisfied. If the condition is satisfied, removal of unusual data is ended. If the condition is not satisfied, the next longest data is removed, the standard deviation is calculated, and it is checked whether the condition is satisfied. This operation is repeated until the standard deviation satisfies the condition.

(2) In the method (1), not only the longest data but also the shortest data is simultaneously removed as unusual data. [Emphasis Added] For example, since a motorbike is not largely influenced by traffic jam, data associated with this motorbike corresponds to the shortest data and can be removed as unusual data."

Ohba et al. provides a system that eliminates longest travel times and shortest travel times from consideration. However, Ohba et al. neither describes nor suggests determining that a travel time between each of the gateways of each of the corresponding pairs of detections is less than a corresponding maximum travel time as claimed.

Accordingly, Applicants submit that Claims 9-11 are patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al. and Ohba et al.

In view of the above, Applicants submit that the rejection of Claims 9-11 under 35 U.S.C. §103(a) should be removed.

Ryu et al. in View of Dwyer et al., Ohba et al. and Sakurai et al.

The Examiner rejects Claim 12 under 35 U.S.C. §103(a) as being unpatentable over Ryu et al. in view of Dwyer et al., Ohba et al., and further in view of Sakurai et al. (U.S. Patent number 5,675,494).

Regarding Claim 12, the Examiner asserts that Ryu et al., Dwyer et al., and Ohba et al. disclose all of the limitations of Claim 11. The Examiner recognizes that Ryu et al., Dwyer et al., and Ohba et al. fail to explicitly disclose a traffic incident and modifying the expected travel time in response to the traffic incident. The Examiner relies upon Sakurai et al. to teach the traffic incident and modifying the expected travel time in response to the traffic incident. The Examiner concludes that it would have been "...obvious to one of ordinary skill in the art...to incorporate the teaching of Sakurai in Ryu, Dwyer and Ohba."

Applicants submit that Claim 12 is patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., Ohba et al., and Sakurai et al., since the cited references neither describe nor suggest "... determining a plurality of chainable detections..." as set forth in Claim 1 and as required by Claim 12.



Ryu et al., Dwyer et al., and Ohba et al. are discussed above. Applicants submit that Sakurai et al. fails to overcome the above deficiencies in Ryu et al., Dwyer et al., and Ohba et al. Sakurai et al. merely describes a "vehicle-mounted unit for an automatic toll collection system that prevents double toll charging." (title) As described more fully below, Sakurai et al. is concerned with providing a single (non-double) vehicle detection within a "travel distance," which is a relatively short distance in a "toll chargeable area." Therefore, Sakurai et al. does not describe or suggest detecting a plurality of chainable detections as claimed.

Applicants submit that Claim 12 is further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., Ohba et al., and Sakurai et al., since the cited references neither describe nor suggest "... determining that a travel time between each of the gateways of each of the corresponding pairs of detections is less than a corresponding maximum travel time," as set forth in Claim 1 and as required by Claim 12.

Applicants submit that Claim 12 is still further patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., Ohba et al., and Sakurai et al., since the cited references neither describe nor suggest "... detecting a traffic incident; and modifying the expected travel time in response to the traffic incident," as set forth in Claim 12.

The present invention provides, as described at page 8, lines 1-2 that "[t]he TMS 20 includes an incident detection system which provides information used to account for expected transactions which are overdue." A "travel time," as used in the present invention, is described for example, at page 11, line 30 to page 12, line 2 where "...the detections come from gateways that are logically consistent with the roadway topology, and the travel time between them is reasonable." Therefore travel time as used in the present invention is a time between detections at gateways along the roadway. As described above, the "travel distance" of Sakurai et al. is a relatively short distance in a "toll chargeable area."

As described above, the Examiner recognizes that Ryu et al., Dwyer et al., and Ohba et al. fail to teach detecting a traffic incident. The Examiner relies upon Sakurai et al., at column 1, lines 29-35, to teach detecting a traffic incident, which states:

"For the automatic toll collection system, toll charging is performed several times if the vehicles stays in the toll chargeable area for a long time due to traffic, accidents or the like and thus, in consideration of the inconvenience of multiple toll charges, the vehicle-mounted unit must have a double toll charging prevention mechanism to prevent double toll charging."

At column 2, line 59, and also in the abstract, Sakurai et al. describes a "travel distance." The travel distance of Sakurai et al. is a relatively short distance in proximity to a toll chargeable area. The travel distance is a region in which a toll may be automatically charged to the vehicle and in which it is undesirable to double charge, if, for example, the vehicle moves slowly through the travel distance. Sakurai et al. fails to describe or suggest the claimed "modifying the expected travel time in response to the traffic incident."

Accordingly, Applicants submit that Claim 12 is patentably distinct over Ryu et al., whether taken alone or in combination with Dwyer et al., Ohba et al., and Sakurai et al.

In view of the above, Applicants submit that the rejection of Claim 12 under 35 U.S.C. §103(a) should be removed.

Ohba et al. in View of Dwyer et al.

The Examiner rejects Claims 29-33 under 35 U.S.C. §103(a) as being unpatentable over Ohba et al. in view of Dwyer et al.

Regarding Claim 29, the Examiner asserts that Ohba et al. discloses a method of determining a trip on a roadway having a plurality of gateways disposed according to a roadway topology comprising: providing a model of the topology including gateway connectivity, a plurality of minimum travel times between pairs of gateways and a plurality of incident free maximum travel times between pairs of gateways; providing a set of rules for applying the model; and applying the rules. The Examiner recognizes that Ohba et al. fails to explicitly

disclose a plurality of vehicle detections and determining a plurality of chainable detections forming a trip. The Examiner relies upon Dwyer et al. to teach disclose the plurality of vehicle detections and determining the plurality of chainable detections forming the trip. The Examiner concludes that it would have been "...obvious to one of ordinary skill in the art...to incorporate the teaching of Dwyer in Ohba."

Regarding Claim 30, the Examiner asserts that Ohba et al. discloses a plurality of expected travel times between the pairs of gateways. Regarding Claims 31-33, the Examiner asserts that the above combination of references discloses a plurality of chainable detections forming a potential trip. The Examiner concludes that it would have been "...obvious to one of ordinary skill in the art...to incorporate the teaching of Ohba in Dwyer."

For substantially the same reasons discussed above, Applicants submit that Claim 29 is patentably distinct over Ohba et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "... determining a plurality of chainable vehicle detections..." as set forth in Claim 29.

Accordingly, Applicants submit that Claim 29 is patentable over Ohba et al. in view of Dwyer et al.

Claims 30-33 depend from and thus include the limitations of Claim 29. Thus, Applicants submit that Claims 30-33 are patentably distinct over the cited references generally for the reasons discussed above in conjunction with Claim 29.

In view of the above, Applicants submit that the rejection of Claims 29-33 under 35 U.S.C. §103(a) should be removed.

Ohba et al. in View of Dwyer et al.

The Examiner rejects Claims 34-38 under 35 U.S.C. §103(a) as being unpatentable over Ohba et al. in view of Dwyer et al.

Regarding Claim 34, the Examiner asserts that Ohba et al. discloses a toll collection system comprising a plurality of gateways. The Examiner recognizes that Ohba et al. fails to explicitly disclose a trip determination processor comprising: a transaction processor; a vehicle detection correlation processor coupled to the transaction processor; a transaction filter processor coupled to the a vehicle detection correlation processor; an end of a trip detection processor coupled to the transaction filter processor; a start of trip detection processor coupled to the transaction filter processor; and a trip formation processor coupled to the transaction filter processor, the end of a trip detection processor, and the start of a trip detection processor. The Examiner relies upon Dwyer et al. to teach the trip determination processor comprising: the transaction processor; the vehicle detection correlation processor coupled to the transaction processor; the transaction filter processor coupled to the a vehicle detection correlation processor; the end of a trip detection processor coupled to the transaction filter processor; the start of trip detection processor coupled to the transaction filter processor; and the trip formation processor coupled to the transaction filter processor, the end of a trip detection processor, and the start of a trip detection processor.

Regarding Claims 35-38, the Examiner asserts that Ohba et al. and Dwyer et al. disclose all the limitations of Claim 34, and that Dwyer et al. discloses a plurality of gateways is adapted for an open ticket tolling system. The Examiner concludes that it would have been "...obvious to one of ordinary skill in the art...to incorporate the teaching of Ohba in Dwyer."

Claims 34 is amended herein to recite "...a vehicle detection correlation processor coupled to the transaction processor and adapted to determine at least one of whether a travel time between pairs of gateways is less than a corresponding maximum travel time and whether a travel time between pairs of gateways is greater than a corresponding minimum travel time... ."

For substantially the same reasons discussed above, Applicants submit that Claim 34 is patentably distinct over Ohba et al., whether taken alone or in combination with Dwyer et al., since the cited references neither describe nor suggest "... a vehicle detection correlation

processor coupled to the transaction processor and adapted to determine at least one of whether a travel time between pairs of gateways is less than a corresponding maximum travel time and whether a travel time between pairs of gateways is greater than a corresponding minimum travel time...," as set forth in Claim 34.

As described above, Ohba et al. merely provides a system that eliminates longest travel times and shortest travel times from consideration. Also as described above, Dwyer et al. merely places no-barrier toll gantries in a closed ticket toll collection system, at the entrances and exits to the roadway.

In view of the above, Applicants submit that Claim 34 is patentably distinct over Ohba et al., whether taken alone or in combination with Dwyer et al.

Claims 35-38 depend from and thus include the limitations of Claim 34. Thus, Applicants submit that Claims 35-38 are patentably distinct over the cited references generally for the reasons discussed above in conjunction with Claim 34.

In view of the above, Applicants submit that the rejection of Claims 34-38 under 35 U.S.C. §103(a) should be removed.

#### The Claim Objections

The Examiner objects to Claim 17 as being dependent upon a rejected base claim, but indicates that Claim 17 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

For the above reasons, Applicants submit that independent Claim 1, from which Claim 17 depends, is patentably distinct over the cited references. Therefore, Applicants submit that Claim 17 is allowable in its present dependent form.

In view of the above amendment and remarks, Applicants submit that Claims 1-38 and the entire case are in condition for allowance and should be sent to issue and such action is respectfully requested.

The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Amendment or this application.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845.

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Respectfully submitted,

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